PATENT
Attorney Docket 4758US

NOTICE OF EXPRESS MAILING
Express Mail Mailing Label Number: EL700255336US
Date of Deposit with USPS: February 16, 2001
Person making Deposit: Jared Turner

APPLICATION FOR LETTERS PATENT

for

SYNTHETIC-GRASS STRUCTURE, CORRESPONDING PARTICULATE MATERIAL, AND USE OF THE PARTICULATE MATERIAL

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"Synthetic-grass structure, corresponding particulate material, and use of the particulate material"

The present invention relates to synthetic-grass structures of the kind known, for example, from US-A-5 958 527.

Basically, a synthetic-grass structure of this type comprises, in normal laying conditions, a sheet substrate with a plurality of filiform formations that extend upwards starting from the substrate itself so as to simulate natural grass cover. A particulate filling material, or infill, is dispersed between the filiform formations in such a way as to maintain the latter in a substantially upright position.

The solution described in the above-mentioned document envisages that the aforesaid infill should comprise:

- a lower or bottom layer, consisting almost exclusively of a hard granular material, such as, typically, sand;
- a top layer consisting almost exclusively of granules of compliant material, consisting, for example, of fragmented rubber material preferably obtained as material recycled from tyres; and
- an intermediate layer comprising a mixture of the two particulate materials referred to above in selectively pre-determined weighted ratios.

Synthetic-grass structures are often considered as being a valid alternative to natural grass above all for applications (sports facilities, etc.) in which, for different reasons (environmental conditions, intense use, etc.), upkeep of natural grass proves to be a critical problem, also as regards the maintenance costs involved.

When making and laying synthetic grass it is,

however, necessary to take into account various requirements which are frequently in contrast with one another.

In the first place, it is desirable for the synthetic grass to present characteristics of tread and response to mechanical stresses (impact of various kinds, etc.) which are basically similar to the characteristics of natural grass.

The above requisite in general proves hard to meet when a sand-based filling material or infill is used.

On the other hand, recourse to sand generally proves advantageous because, precisely on account of its intrinsic weight, sand is able to provide a good effect of stabilization of the sheet substrate which constitutes the backing of the synthetic-grass cover, the said flooring usually being free laid. Furthermore, sand constitutes a filling material that is readily available at contained prices.

One of the main drawbacks linked to the use of sand is the fact that, in the case of a player or athlete falling on the synthetic covering (for example, an athlete taking part in a competition on synthetic grass), contact with the sand infill may easily give rise to scratches or bruises.

Other problems are linked to the effect of abrasion, and hence of mechanical wear, that sand invariably exerts on the filiform formations (usually made of a synthetic material, such as polypropylene, various copolymers, etc.) which simulate the blades of grass. This effect of wear may in more or less long time periods lead to breaking or tearing and consequent dispersion of the synthetic blades of grass.

Yet other problems are linked to the rate with which rain water can be removed from the synthetic flooring, given that, at least under certain

conditions, the rain may collect in an undesired way in the infill of the synthetic grass.

For a more detailed treatment of the above problems and of substantially related ones, useful reference may be made to the introductory part of the document already cited.

The purpose of the present invention is to furnish a solution which enables synthetic-grass floorings to be made, overcoming the problems that may be encountered in the known art in a particularly advantageous way.

In accordance with the present invention, the above purpose is achieved thanks to a synthetic-grass structure having the characteristics specifically called for in the claims which follow.

The invention also refers, independently, to the corresponding particulate infill, as well as to the use of the latter.

The present invention will now be described, purely by way of a non-limiting example, with reference to the attached drawings, which consist of a single figure that reproduces schematically an idealized vertical section of a synthetic-grass structure according to the invention.

According to a solution which is on the whole known, the aforesaid synthetic-grass structure comprises a sheet substrate 1, which is designed to be laid on a subfloor G, which, in the most typical condition of use, consists of a subfloor made of tamped earth, over which the synthetic-grass cover is free laid.

The sheet substrate 1 may be made up of a sheet of plastic material, such as a non-woven fabric rubber-backed with the application, for example, of latexes, such as SBR latex.

Starting from the substrate 1, a plurality of filiform formations 2 extend upwards, the said filiform formations being usually arranged in tufts so as to resemble more closely the blades of grass of natural grass cover.

The filiform formations 2 are anchored to the substrate 1 by their proximal ends, designated by 2a, and extend upwards with their distal ends for a total length, measured starting from the general plane of extension of the substrate 1, which is typically in the region of 30-50 millimetres.

The general criteria for making the substrate 1 and filiform formations 2 (including the modalities for obtaining firm anchorage of the proximal ends 2a of the filiform formations 2 on the substrate 1) are known to the art, and hence do not require a detailed description herein also because they are of themselves not important for the purposes of understanding the invention.

Likewise known is the fact that a particulate material 3 functioning as infill is dispersed, usually during the laying of the synthetic grass on top of the substrate 1, and hence between the filiform formations 2. The function of the infill 3 is substantially that of maintaining the filiform formations 2 in an upright condition, i.e., preventing them from lying flat down in an undesired way on the substrate 1.

The particulate material 3 is usually dispersed between the filiform formations 2 in a sufficient amount for the distal portions of the filiform formations 2 to be supported by the infill 3 for a length ranging, for example, between 20 and 30 mm. This means that the distal ends of the filiform formations 2 extend out from the top surface of the layer of infill 3 for a length of about 10-20 mm.

An important feature of the solution according to the invention is provided by the characteristics of the particulate material 3. It is in fact a homogeneous material dispersed on top of the substrate 1 and between the filiform formations 2 in a substantially uniform way without giving rise to superimposed layers having different characteristics.

In the currently preferred embodiment of the invention, the aforesaid particulate material is a granular material with a grain size ranging typically between 1.5 and 4.5 mm and a density ranging typically between 1.5 and 1.6 grams/cm^3.

In a particularly preferred embodiment, the aforesaid material is made up of polyolefin material, such as polyethylene, and, in a yet more preferred way, of recycled polyolefin material, such as recycled polyethylene.

In another envisaged embodiment of the invention, the aforesaid material consists of a vinyl polymer, such as PVC, and, in a yet more preferred way, of recycled vinyl polymer, such as recycled PVC.

Preferably, the granules are obtained by subjecting the source material to a drawing treatment and subsequent fragmentation by means of a blade at output from the extruder/drawing machine used for the drawing process. Particularly preferred results have been obtained using drawing machines in which diameter of the die is in the region of 2.5-3.5 mm.

Preferably, the granular material has an apparent density of about 600-700 grams/litre. With a laying thickness (i.e., with a height of the layer of infill material 3 dispersed on the substrate 1) of approximately 30 mm, the total amount of dispersed infill 3 is about 15-21 kg/m^2, which is altogether satisfactory for the purpose of obtaining a firm

retention of the synthetic grass on the subfloor G.

The fact that all the infill 3 consists of granules of material of the type described, and hence a material having a certain degree of resilience, means that any falls that may occur on the synthetic-grass cover will not give rise to undesired effects, such as bruises or scratches.

Tests carried out by the present applicant moreover show that the synthetic grass made according to the invention has, in regard to stresses caused by treading and impact, a behaviour which is basically similar to that of natural grass.

The tests conducted by the applicant have moreover revealed substantial absence of undesired phenomena of wear of the filiform formations 2 by the infill 3. The structure of the synthetic-grass cover according to the invention has moreover revealed excellent characteristics as regards disposal of rain water.

A further advantage of the solution according to the invention is provided by the fact that, should it be necessary to proceed to the removal of the synthetic-grass cover, the infill 3 can be reused and recycled completely, also on account of its altogether uniform structure.

Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary widely with respect to what is described and illustrated herein, without thereby departing from the scope of the present invention.